

REMARKS

Reconsideration of the above-identified application, as amended, is respectfully requested.

In the present Official Action, which constitutes a Final Rejection, the Examiner first rejected the Claims 1, 2, 4 and 7-9 under 35 U.S.C. §102(e) as allegedly being anticipated by Xiang (U.S. Patent No. 6,849,527)(“Xiang”) as allegedly teaching and describing the invention. The Examiner further rejected Claims 5 and 6 as allegedly unpatentable over Xiang in view of Noda et al. (U.S. Patent No.6,432,802) (“Noda”).

In response to the rejection of Claims 1, 2, 4 and 7-9 under 35 U.S.C. §102(e) as being anticipated by Xiang, Applicants respectfully disagree.

With respect to Claim 1, applicants amend the claim to set forth a semiconducting field-effect transistor device comprising:

a first strained layer of semiconductor material doped of a first dopant type formed on a substrate;

a source region and a drain region implanted with dopants of a second opposite type; a gate electrode separated from the first layer by a dielectric region, and positioned between said source and drain regions;

said substrate having one or more threading dislocations, misfit dislocations or crystal defects that extend continuously from the source region to the drain region at an interface between said first strained layer of semiconductor material and said substrate, and

blocking impurity dopant materials selected from the group comprising: In, Pb, Sb and Sn, that partially or fully occupies each said one or more threading dislocations, misfit

dislocations or crystal defects, wherein said blocking impurity dopant materials substantially inhibit diffusion of said implanted source and drain dopants from diffusing along said threading dislocations, misfit dislocations or crystal defect.

Respectfully, no new matter is being added and full support is found in the specification (e.g., at paragraphs [0022] – [0025]) and Claims 5, 6 and 9 as originally filed.

Applicants respectfully request consideration and entry of the amendments herein as they are presented herein for clarification purposes and to further define the inventive features, and to further address the Examiner's Response to Arguments where the Examiner relies upon a reference (C. Claeys et al., *Electrochem. Soc.* 148, G 738 (2001)) mentioned in the Final Rejection and not made of record in this case.

In the present invention, it is clear that the semiconducting substrate of the FET device claimed has one or more threading dislocations, misfit dislocations or crystal defects that extend continuously from the source region to the drain region at an interface between a first strained layer of semiconductor material and the substrate, and that blocking impurity dopant materials selected from the group comprising: In, Pb, Sb and Sn, are provided that partially or fully occupies each said one or more threading dislocations, misfit dislocations or crystal defects, wherein said blocking impurity dopant materials substantially inhibit diffusion of said implanted source and drain dopants from diffusing along said threading dislocations, misfit dislocations or crystal defect.

As an initial consideration, “[a] claim is anticipated [under 35 U.S.C. §102] only if each and every element set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” MPEP 2131 (citing *Verdegaal Bros. v. Union Oil of California* (citation omitted)). Thus, anticipation under 35 U.S.C. §102 requires a clear

disclosure (i.e., either an express disclosure or an inherent disclosure) within a single prior art reference of all limitations or elements of an applicant's claimed invention.

Xiang respectfully, only teaches use of a Carbon impurity implanted in a device active region for purposes of enhancing carrier mobility in that region. For this reason, Xiang cannot be said to be anticipatory as Xiang does not teach use of blocking impurity dopant materials selected from the group comprising: In, Pb, Sb and Sn, are provided that partially or fully occupies each said one or more threading dislocations, misfit dislocations or crystal defects, as recited in amended Claim 1.

Also, more particularly with respect to rejection of applicant's claims as inherently anticipated by a particular reference, “[t]he fact that a certain result or characteristic may occur or be present in the [particular] prior art [reference] is not sufficient to establish the inherency of that result or characteristic [for purposes of rejecting an applicant's claims to the applicant's invention as anticipated under 35 U.S.C. §102].” MPEP 2112 (citing *In re Rijckaert* (emphasis in original and citation omitted)).

The Examiner, in a first instance, asserts that all limitations within applicant's claim 1 are taught within Xiang, including in particular Xiang at Fig. 3i. According to this rejection, the Examiner asserts that all limitations within applicant's claim 1 are taught within Xiang, especially in view of a non-cited reference C. Claeys et al., *Electrochem. Soc.* 148, G 738 (2001) relied upon by the Examiner for the teaching that a heavy ion, e.g., Sn, when implanted in Si acts as a vacancy “getter.” (See Response to Arguments section, page 6 of Office Action). For these reasons, the Examiner particularly asserts that “the presence of carbon ions in the device of Xiang also inherently function as claimed”.

Clearly, in the first instance, Xiang's sole teaching, as stated herein, is the use of a Carbon impurity implanted in a strained device active region for purposes of enhancing carrier mobility in that region. Applicant respectfully submits that he is simply unable to locate within Xiang a particular express or inherent teaching of: use of blocking impurity dopant materials selected from the group comprising: In, Pb, Sb and Sn, provided to partially or fully occupy each said one or more threading dislocations, misfit dislocations or crystal defects, to substantially inhibit diffusion of said implanted source and drain dopants from diffusing along said threading dislocations, misfit dislocations or crystal defect as needed to properly reject applicant's Claim 1 under 35 U.S.C. §102(e) as being anticipated by Xiang.

Applicant in particular asserts that the foregoing teachings making use of blocking impurity dopant materials selected from the group comprising: In, Pb, Sb and Sn, provided to partially or fully occupy each said one or more threading dislocations, misfit dislocations or crystal defects, to substantially inhibit diffusion of said implanted source and drain dopants from diffusing along said threading dislocations, misfit dislocations or crystal defect are not inherent within Xiang, since applicant asserts that there may plausibly be alternative reasons within CMOS fabrication for using these implantation impurities, e.g., enhancing mobility of carriers as described in Xiang, creating other stresses/strains within a device region, or forming an amorphous layer in a semiconducting region (See cited reference to Noda et al. US Patent No. 6,432,802 at col. 2, lines 64-66)).

Thus, since each and every limitation within applicant's invention as disclosed and claimed within amended claim 1 is not taught within Xiang, either expressly or inherently, in particular with respect to implanting blocking impurity dopant materials selected from the group comprising: In, Pb, Sb and Sn, provided to partially or fully occupy each said one or

more threading dislocations, misfit dislocations or crystal defects, to substantially inhibit diffusion of said implanted source and drain dopants from diffusing along said threading dislocations, misfit dislocations or crystal defect, applicant asserts that claim 1 may not properly be rejected under 35 U.S.C. §102(e) as being anticipated by Xiang. Due to their dependency upon claim 1, applicant also asserts that claims 2, 4 and 7 - 9 may also not properly be rejected under 35 U.S.C. §102(e) as being anticipated by Xiang.

As such, the Examiner is respectfully requested to withdraw the rejection of Claims 1,2, 4 and 7-9 under 35 U.S.C. §102(e).

With respect to the rejections of Claims 5 and 6, as allegedly unpatentable over Xiang in view of Noda, applicants respectfully disagree. Xiang teaches use of halo extensions as generally known to encompass the source and drain diffusions. Noda, while teaching implantation of specific heavy ions, e.g., Indium, is for the purpose of forming an diffusion pocket layer that, as shown in every figure of Noda, is formed beneath the source and drain diffusion regions. Noda is not even directed to strained-Si substrates and does not address the same problem as Xiang relating to enhancing mobility of carriers in the channel regions to counteract effects of stress/strain. Thus, as neither Noda nor Xiang teach or suggest the implantation of blocking impurity dopant materials selected from the group comprising: In, Pb, Sb and Sn, provided to partially or fully occupy each said one or more threading dislocations, misfit dislocations or crystal defects, to substantially inhibit diffusion of said implanted source and drain dopants from diffusing along said threading dislocations, misfit dislocations. Applicants respectfully submit that Claims 5 and 6 can not be rejected under 35 U.S.C. §103(a) as being unpatentable over Xiang in view of Noda.

As such, the Examiner is respectfully requested to withdraw the rejection of Claims 5 and 6 under 35 U.S.C. §103(a).

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Accordingly, it is respectfully requested that this application be allowed and a Notice of Allowance be issued. If the Examiner believes that a telephone conference with the Applicants' attorneys would be advantageous to the disposition of this case, the Examiner is requested to telephone the undersigned, Applicants' attorney, at the following telephone number: (516) 742-4343.

Respectfully submitted,



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